July 31, 1923. 1,463,712

A. R. MEAD

PRIMING DEVICE

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Fig. 1.

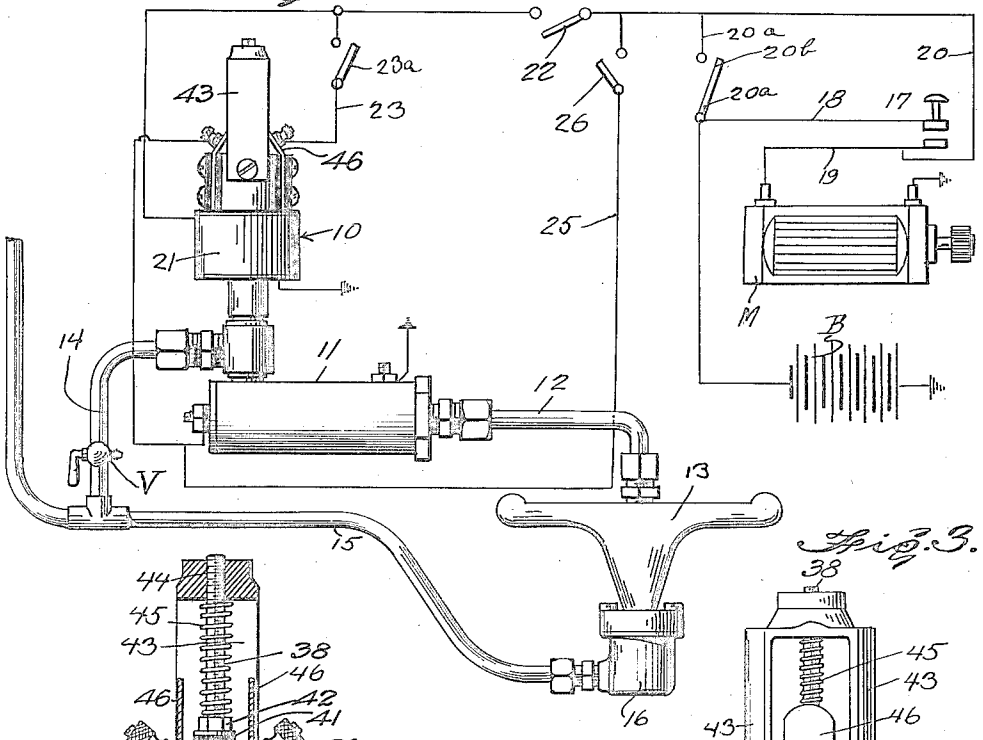


Fig. 2.

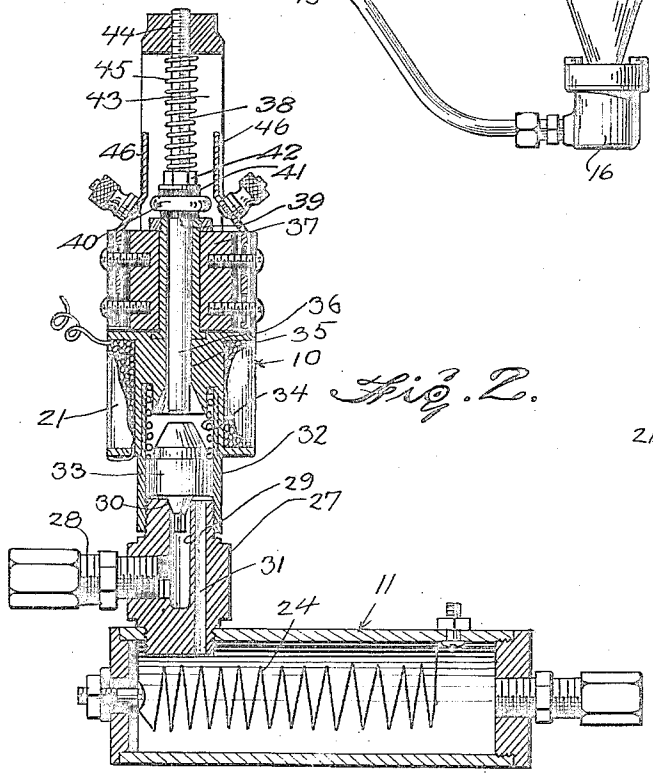
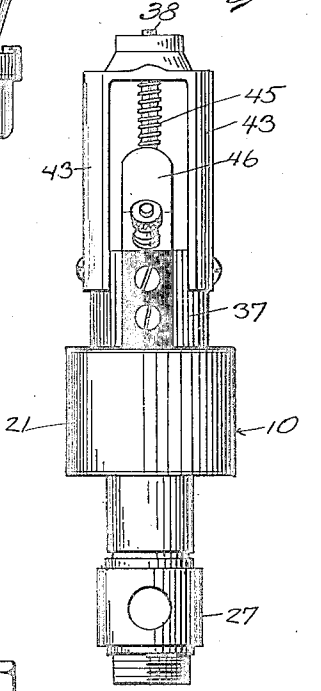


Fig. 3.



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Fig. 5.

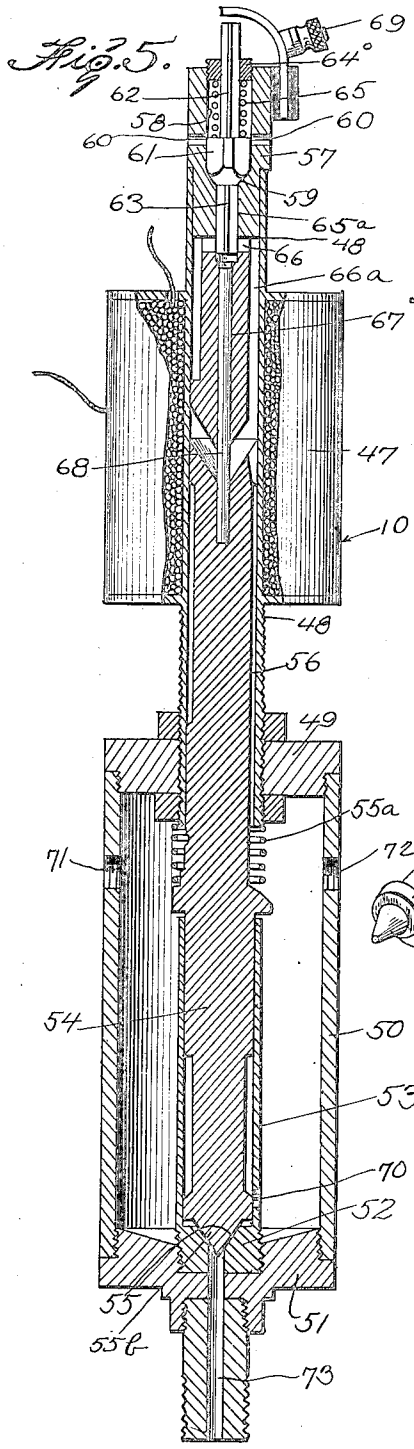


Fig. 4.

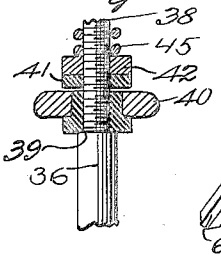


Fig. 6.

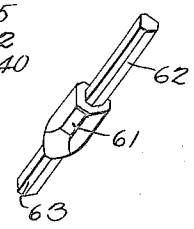


Fig. 7.

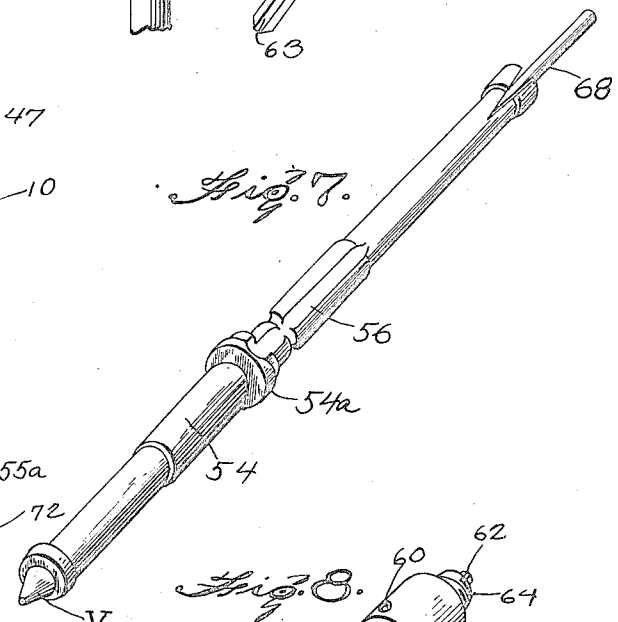
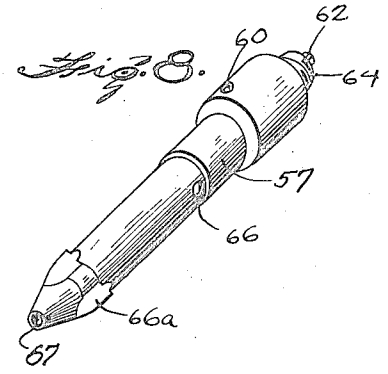


Fig. 8.



Inventor

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Patented July 31, 1923. 1,463,712

UNITED STATES PATENT OFFICE.

ALBERT R. MEAD, OF NEWARK, NEW JERSEY.

PRIMING DEVICE.

Application filed May 28, 1921. Serial No. 473,454.

To all whom it may concern:

Be it known that I, ALBERT R. MEAD, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Priming Devices, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in priming devices and more particularly to a priming device for use in connection with internal combustion engines.

An important object of the invention is to provide a device of this character which is automatically rendered active upon operation of the starting motor.

A further object of the invention is to provide improvements whereby the priming device may be rendered inoperative under conditions where it is not needed, as for example, when the motor is warm.

A further object of the invention is to provide a priming device and a heating device for the priming charge, both of which are rendered active upon actuation of the starting motor of the engine.

A further object of the invention is to provide a device of this character which may be used in either vacuum pressure or gravity systems, and which, when in use in the latter system, is provided with means for admitting air to the priming charge so as to permit of ready flow thereof from the container.

A further object of the invention is to provide a device of this character which may, if so desired, be employed for supplying auxiliary air to the motor during the operation thereof.

A still further object of the invention is to provide a device of this character which is extremely compact in construction and of a simple nature in order that the operation thereof may be attained with as little trouble as possible.

Other objects and advantages of the invention will become apparent throughout the course of the following description.

In the accompanying drawings, wherein for the purposes of illustration are shown preferred embodiments of my invention and wherein like reference characters designate like parts throughout;

Figure 1 is a side elevation partially diagrammatic, showing one form of my device connected mechanically and electrically with a motor for operation as described;

Figure 2 is an enlarged sectional view taken through this form of my device;

Figure 3 is a side elevation taken at right angles to the view shown in Figure 1, the heating device being removed;

Figure 4 is a sectional view illustrating the mounting of the contact device for the heating element;

Figure 5 is a longitudinal sectional view partially in elevation showing a slightly modified form of my device; and

Figures 6, 7 and 8, are detail views of the operating portions thereof.

Referring now more particularly to the drawings, the numeral 10 indicates an electro-magnetically controlled device whereby the introduction of a priming charge is controlled, and the numeral 11 a heating device for heating the priming charge. This heating device is in communication by a conduit 12 with the intake manifold of an internal combustion engine, and the intake of a priming charge control device 10 is in communication by a conduit 14 with the fuel line 15 to the carbureter 16. The conduit 14 has a valve V arranged therein for a purpose presently to appear.

The character M designates the starting motor of the engine, and 17 the switch controlling the circuit thereof, one wire 18 of the circuit being in communication with one terminal of the battery B having its opposite terminal grounded, and the other wire 19 of the circuit being connected with one terminal of the motor, the opposite terminal of which is likewise grounded. This wire 19 has shunt-connected thereto a wire 20 which is connected with one terminal of a magnetic coil 21, the opposite terminal of which is likewise grounded. In the wire 20 a switch 22 is preferably arranged so that the magnetic coil may be rendered inoperative when desired. The wire 20 is preferably likewise connected in shunt with the wire 18 of the motor circuit by a wire 20^a having a switch 20^b arranged therein so that the circuit may be broken. It will be seen that the circuit to the magnetic coil 21 may be completed, when the switch 22 is closed, either by closing of the switch 17 of the starting motor circuit

or by closing the switch 20^b, so that the coil may be energized either simultaneously with or independently of the starting motor.

The wire 20 has likewise shunt-connected thereto a wire 23 connected with one terminal of the heating coil 24 of the heating element 11, the opposite terminal of the heating coil being grounded. The circuit as represented by the wire 23 is usually broken, and its closing depends, as will hereinafter more fully appear, upon actuation of the coil 21. The wire 20 may be further connected with the aforesaid terminal of the heating coil 24 by a wire 25 having a switch 26 arranged therein. By this arrangement, when the coil 21 is energized, the circuit of the wire 23 is completed and the heating coil 24 energized, or, if desired, the heating coil 24 may be energized by closing the switches 20^b and 26, thereby energizing the heating coil independently of the actuation of the magnet. The purpose of these various control circuits will hereinafter more fully appear.

The electro-magnetic control device embodies a chamber or fitting 27 having an inlet 28 communicating with a bore 29, the upper end of which is shaped to form a valve seat 30. This fitting 27 is likewise provided with a bore 31 extending longitudinally entirely through the fitting and communicating at its lower end with the interior of the heating device 11 which is engaged by the lower end of the fitting 27.

The upper end of the fitting 27 is provided with screw-threads for the reception of the lower end of a sleeve 32, the upper end of which extends into a bore formed in the core of the electro-magnet coil 21, and this sleeve 32 forms a guide-way for a valve 33 having a body forming an armature for the coil and which valve normally engages the seat 30 by reason of a spring 34 extending between the core of the electro-magnet and the valve. The core of the electro-magnet is provided with a bore 35 through which extends a stem 36 having a loose fit in the bore.

This stem likewise extends through a guide-way 37 extending upwardly from the upper surface of the coil, and projects thereabove. The upper end of the stem is reduced and externally screw-threaded, as at 38, thereby forming a shoulder 39 upon which is seated a contact member 40 which is insulated from this stem by insulation 41 held in position against the shoulder by a binding nut 42. This insulation abuts the upper end of the guide surrounding the bore 20 and normally closes passage through the bore.

The numeral 43 indicates a yoke secured to the guide member 37 and extending upwardly therefrom, which yoke is provided in its upper end with an opening 44 forming a guide for the reduced portion 38 of the stem 36. This portion of the stem is surrounded by a spring 45 extending between the yoke and the binding nut 42 and normally holding the stem and contact element 40 in the lowermost position. Secured to and insulated from the guide member 37 are contact members 46 to which portions of the wire 23 are attached. When the stem is elevated against the action of the spring, the contact member 40 engages the contacts 46, completing the circuit through the wire 23, to the heating element 11.

The operation of this form of my device is as follows: When the starting motor M is energized by closing of the switch, assuming the switch 22 to be closed, the electro-magnet coil 21 is energized, and accordingly the armature valve 33 is attracted permitting the fuel entering through the inlet 28 to pass through the bores 29 and 31 to the heating chamber, and so to the conduit 12 and intake manifold of the engine. The armature valve 33, in its upward travel, engages the lower end of the stem 36, causing the same to move upwardly, bringing the contact member 40 into engagement with the contact 46 and closing the circuit through the wire 23 to the heating element, and accordingly the fuel is heated during its passage to the engine. The elevation of the stem 36 likewise permits the passage of air downwardly into the interior of the device so that the passage of the fuel is not interfered with by the formation of vacuum pockets in the device.

In the forms shown in Figures 5, 6, 7 and 8, a solenoid coil 47 is employed instead of the coil 21, but is connected in the circuit in exactly the same manner as previously described. The guide coil 48 of the solenoid is extended beyond the ends of the coil and at one end has secured thereto one head 49 of a fuel chamber 50, the opposite head 51 of which has mounted therein a valve seat 52 embodying an upwardly extending guide 53 alined with the armature guide 48 of the solenoid 47. The armature 54 of the solenoid operates within these guides and is provided upon its lower end with a valve 55^b normally held in engagement with the seat 55 by means of a spring 55^a extending between a shoulder 54^a formed upon the armature, and a head 49 of the chamber 50. The portion of the armature 54 which travels within the guide 48 of the solenoid is so formed as to permit the passage of air thereby, as indicated at 56.

Mounted in the upper end of the solenoid guide 48 is a relatively stationary member 57 having in its upper end a bore 58 terminating at its lower end in a valve seat 59. The bore 57 is in communication with the openings through ports 60. Mounted for

reciprocation within the bore is a valve 61 embodying upper and lower guide stems 62 and 63. The upper guide stem extends through an opening formed in a screw-plug closure formed in the upper end of the bore 58, and the spring 65 surrounds the valve stem 62 and extends intermediate the valve and screw-plug 64, normally holding the valve 61 upon its seat. The lower guide stem 63 of the valve 61 operates in a reduced bore 65^a formed in the member 57 and is triangular in form to permit the ready passage of air thereby. The lower end of the bore 65^a is in communication with the port 56 through transverse ports 66, and through port 66^a formed by notching the side of the lower end of the member 57.

The member 57 is likewise provided with a longitudinal bore 67 extending through the lower end thereof and communicating with the lower end of the bore 65, and the upper end of the armature member 54 has formed thereon or secured thereto a tappet rod 68, the purpose of which will presently appear.

The former device last described is particularly well adapted for use in connection with engines using the vacuum fuel feed system or where gravity is depended upon to feed the fuel or other liquid in priming. In its operation, upon energizing of the solenoid coil 47, the armature member 54 is shifted longitudinally, uncovering the port 70 and opening a passage for the liquid within the container to pass out. Simultaneously, the elevation of the armature member causes the tappet 68 thereof to engage the lower end of the lower valve stem 63 of the valve 61 and shift the valve upwardly from its seat and admitting air to the chamber through ports 60, bore 58, bore 65, ports 66, 66^a and 56. If desired, the upper end of the member 57 may have secured thereto a circuit-closing element 69 which is engaged by the upper valve stem 62 to complete a circuit for energizing the heating element 11. It is pointed out that when in use with vacuum systems that the fuel line be connected at the port indicated at 71, and the vacuum line at the port indicated at 72. By this arrangement the container or chamber 50 would be filled with liquid during the normal operation of the engine and at the same time upon energizing of the solenoid the vacuum would be broken to permit the fuel to flow through the outlet port 73.

It is further pointed out that by closing the valve V, in the conduit 14, the introduction of fuel may be discontinued through either of the devices shown. It will thus be seen that by closing the switches 20^b and 22, the solenoid will be energized and the valve 33 or 55^b, as the case may be, will be opened, permitting the introduction of auxiliary air to the engine when the same is desired. The effect of introduction of auxiliary air upon the operation of an engine is too well known for me to discuss it.

From the foregoing it is believed to be obvious that I have constructed a priming device which may be readily attached to and employed with internal combustion engines but which is not necessarily employed in this conjunction since it will be obvious to those familiar with the art that either of the devices shown can readily be attached for priming pumps, or similar devices. It will furthermore be obvious that the constructions hereinbefore set forth are capable of some change in modification without in any manner departing from the spirit of my invention, and I accordingly do not limit myself to such specific structure except as hereinafter claimed.

I claim:

1. In a priming device, a priming charge heater, a casing having an inlet and an outlet, the latter communicating with the priming charge heater, a valve normally preventing communication between the inlet and outlet, means for shifting the valve to permit such communication, means operated by the shifting of the valve for admitting air to the casing and for energizing the priming charge heater.

2. In an attachment for internal combustion engines and in combination, a normally inoperative heating element, a casing having an air inlet, a fuel inlet, and an outlet communicating with the heating element; the heating element communicating with the intake manifold of the engine, a valve controlling the air inlet of the casing, a valve within the casing normally closing communication between the fuel inlet and the outlet of the casing, and means for shifting the last named valve, the shifting of the last named valve shifting the air inlet valve to open the same and rendering said heating element operative.

3. In an attachment for internal combustion engines and in combination, a casing having an air inlet, a fuel inlet, and an outlet communicating with the intake manifold of the engine, a valve controlling the air inlet of the casing, a valve controlling communication between the fuel inlet and the outlet of the casing, means for shifting the last named valve, and a stem for the first named valve disposed in the path of movement of the last named valve and engaged thereby during movement of the last named valve to the open position whereby the shifting of the last named valve operatively engages said air inlet valve to open the same.

In testimony whereof I hereunto affix my signature.

ALBERT R. MEAD.